

and supratrochlear nerves. Galeal suspension is accomplished by plication sutures at the level of the skin incisions or by fixation to microscrews placed in the calvarium. Skin resection is generally not necessary.

The advantage of this technique is greater patient acceptance of the procedure. Early reports have indicated that endoscopic brow lifts are accompanied by diminished bleeding and swelling, less scalp anesthesia, and a less noticeable scar. In a review of 61 patients undergoing endoscopic brow lift, no important complications occurred, and results were equal to those with the open coronal approach.

The natural extension of this procedure, endoscopic face lift, is also gaining acceptance. Patient selection for this procedure is critical. Ideal candidates are younger (<50 years of age) and have good skin tone without nasolabial folds or prominent malar fat pads. Patients with substantial skin redundancy are best served by standard rhytidectomy. The endoscopic dissection is accomplished in the subcutaneous plane in the lower half of the face and in a subperiosteal plane in the upper third of the face by two temporal and posterior mastoid incisions about 1.5 cm long. An intraoral buccal sulcus and lower blepharoplasty incision can be used. After wide undermining, the soft tissues are suspended by endoscopically tied knots to the temporalis fascia and periosteum. The neck can also be treated using endoscopy or by direct vision through a submental incision.

Several other procedures, including abdominoplasty and breast augmentation, are currently being studied for their applicability to endoscopic-assisted dissection, and the list will undoubtedly continue to grow. Surgeons should view the current wave of enthusiasm for endoscopic plastic surgery with a note of caution, however. As with most new medical advances, the indications and applications are likely to be extended unnecessarily initially. Not until further experience with these techniques is reported should endoscopic manipulation in plastic surgery become routine.

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## Chemical Peels in Plastic Surgery

CHEMICAL PEELS have gained widespread acceptance in the treatment of aging faces. Used appropriately, peels have proved effective in treating actinic damage, including fine wrinkles, pigmentary abnormalities, and dryness. Superficial acne scarring also responds favorably.

Many chemicals are available for facial peeling, including phenol, trichloroacetic acid (TCA), and the

$\alpha$ -hydroxy acids. All act by varying degrees of cellular destruction of the epidermis and papillary dermis, producing consistent histologic changes. These include homogenization of the dermal collagen structure, the diminution of melanin granules in the basal epidermis, and an increase in elastic tissue. This results in a leveling of superficial irregularities including fine wrinkles.

Phenol, the most commonly used agent, is a derivative of coal tar. Popularized by the work of Baker and Gordon in the 1960s, it is generally used at a concentration of 50%. Higher concentrations result in increased toxicity without additional therapeutic benefit. Infrequently, phenol can cause cardiac arrhythmias, and full-face phenol treatments should not be done without continuous electrocardiographic monitoring and intravenous access. This complication is more common when more than 50% of the face is treated in less than 30 minutes.

Phenol is mixed in a formula consisting of 3 ml of phenol, 2 ml of water, 8 drops of soap, and 3 drops of cotton oil. After applying, many practitioners place a light layer of antibiotic ointment to prevent evaporation and enhance wound healing.

Trichloroacetic acid is used at concentrations varying from 15% to 50%, with higher concentrations producing deeper peels. Unlike with phenol, there is no systemic toxicity, and the response to the agent is not all or none. The results obtained are highly dependent on prepeel skin preparation, including washing with soap, degreasing with acetone or ether, and applying a keratinolytic agent such as Jessner's solution (resorcinol, salicylic acid, and lactic acid) to disrupt the stratum corneum. Failing to prepare the skin adequately can result in a spotty peel. The method of application can enhance results. Repeated application or vigorous rubbing of the acid into the treated area increases the depth of penetration.

The  $\alpha$ -hydroxy acids have enjoyed a recent burst of popularity among lay practitioners of skin care. All are derived from the fermentation of natural food sources such as fruit, with the first documented use occurring in ancient Egypt when sour milk (lactic acid) was applied to the face to enhance beauty. At low concentrations (usually less than 10%), these substances are found in over-the-counter skin preparations. Their effect is based on reducing the cohesion of the keratinocytes, producing desquamation and epidermolysis. They have a good safety profile but limited clinical efficacy. The most commonly used fruit acid, glycolic acid, works to loosen the buildup of dead skin cells. Over a series of treatments in a six- to eight-week period, this exfoliation process results in softer and smoother skin. The duration of effects is being studied. Currently, only plastic surgeons and dermatologists are doing TCA and phenol peels, as well as  $\alpha$ -hydroxy peels of a 50% to 70% concentration.

After a facial peel, patients can expect crusting to occur in the first three to five days. During this time, they are instructed to apply topical antibiotic ointment. By 10 to 14 days, the crusting has resolved, with the underlying skin taking on an erythematous appearance. Moisturizing lotion is used liberally to prevent secondary drying and

cracking. Patients are instructed to stay out of direct sunlight for four to six months because a substantial number of melanocytes are removed during the peeling process. In the event of sun exposure, all patients should wear a sunscreen with a sun protection factor of 15 or greater.

Complications are most frequently related to pigment changes. In patients with darker complexions, hyperpigmentation may develop over treated areas, which, although usually transient, can be permanent. This can be prevented or minimized by applying hydroxyquinone, a bleaching agent, before or after the peel. In addition, the erythema seen in all chemically peeled skin may persist for several months. Involution of the redness is accelerated by the application of a steroid cream, if needed. The most serious complication is hypertrophic scarring or full-thickness skin loss from a peel that extends too deeply. This can usually be avoided by reducing the concentration, the application pressure, or the duration of the peeling agent and by avoiding skin recently undermined by rhytidectomy or blepharoplasty. When used appropriately by experienced professionals, complications are rare, particularly with TCA and  $\alpha$ -hydroxy acid peels.

No discussion of peeling agents would be complete without mentioning topical retinoic acid (tretinoin). Although not used as a peeling agent itself, it is frequently used for prepeel skin conditioning. Its mechanism of action is unknown, but it is thought to involve diminishing the cohesiveness of epithelial cells, stimulating mitosis, and causing a thickening of the dermis and compaction of the epidermis. Although approved by the Food and Drug Administration for the treatment of cystic acne only, it is currently in broad use for the long-term correction of fine facial wrinkling.

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## Breast Reconstruction

A RECONSTRUCTIVE OPTION is available for almost any woman undergoing a mastectomy. Reconstruction is an important step in a woman's recovery from cancer or other breast disease. Reconstruction promotes a woman's sense of well-being, wholeness, and recovery. This option should be explained to her before mastectomy and even before she makes a decision regarding mastectomy versus lumpectomy. Women who undergo reconstruction at the same time as a mastectomy do better emotionally postoperatively. At any time following a mastectomy, however, even many years later, a woman may consider and undergo reconstruction.

Reconstruction should not be postponed because of the possibility of further treatment, such as chemotherapy.

Chemotherapy cannot start until the patient recovers from the mastectomy. Recovering from the reconstruction, therefore, if done at the same time as the mastectomy, does not delay the start of chemotherapy. In addition, it has been shown that breast reconstruction does not interfere with the early detection of recurrence of breast carcinoma.

In general, breast reconstruction can be divided into two types, using either autologous tissue or implants. Reconstruction involving implants first requires the use of a tissue expander. This is placed at the time of the initial mastectomy, under the pectoralis muscle. The tissue expander is then slowly inflated to stretch the mastectomy flaps. Once the flaps have been expanded to a size larger than the opposite breast, a second procedure is done to exchange the expander for a permanent saline or silicone implant. The second procedure can be done on an outpatient basis, using either local or general anesthesia.

A reconstructed breast using an implant is usually higher, firmer, and rounder than the opposite breast. The ideal patient for this type of reconstruction has small, nonpendulant breasts. It is also an excellent method for patients requiring bilateral mastectomy, as symmetry can be easily achieved.

Silicone implants are available for women undergoing reconstruction, under strict guidelines and surveillance of the US Food and Drug Administration. Saline implants also offer an excellent reconstruction for many women undergoing this procedure. In some patients with a thin skin-and-muscle covering over the implant, a rippling can occur in the upper pole of the reconstructed breast, resulting in an unnatural feel.

The second type of reconstruction involves using a patient's own tissue. Most commonly, the skin and fat of the abdomen can be elevated on one of the underlying rectus abdominis muscles and transferred to the chest area to reconstruct the breast mound. This method is called a TRAM (transverse rectus abdominis myocutaneous) flap. It generally results in a superior breast reconstruction, giving a natural feel and appearance. It also dispenses with the need for implanted materials and can be accomplished in one stage. These procedures can also be used for bilateral reconstruction because both rectus muscles can be elevated, each carrying half of the skin and fat of the lower abdomen. When reconstruction is done using only one rectus muscle, little or no abdominal strength is lost. Women who undergo bilateral reconstruction involving the use of both rectus muscles can sometimes experience abdominal and back weakness, however. Currently, the TRAM flap is the preferred procedure in postmastectomy reconstruction.

The latissimus muscle can also be transferred from the back. This usually does not provide enough tissue for an adequate breast mound and often requires the use of a supplemental implant. This is a good method for patients who are obese, smoke cigarettes, or who have had multiple abdominal operations (all of which can compromise the blood supply of flaps) and, therefore, are not candidates for a TRAM procedure. The tissue expander with